

!PlanWorks Tutorial

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PlanWorks Tutorial

PlanWorks is a Java tool to help you visually inspect the details of a plan (token states, variable domains, timelines, constraints, etc) as it evolves over time. It takes advantage of the fact that a EUROPA run can create a *Planning Sequence*, which is essentially a set of detailed logs for each planning step.

PlanWorks was the original debugging tool built with EUROPA; some users now find the PSDesktop tool easier to use for debugging and plan visualization. However PlanWorks includes functionality that has not yet been ported over to PSDesktop and is therefore briefly outlined here. Compared with PSDesktop, PlanWorks has the following advantages and disadvantages:

- **Advantages:**

- ◆ Many low-level pieces of information are ready to be inspected without any setup by the user.
- ◆ Some pieces like rule information are viewable in PlanWorks that are currently not available to PSDesktop.
- ◆ Because details at each step are logged, PlanWorks allows a user to step backward and forward in time at will to see how a plan has changed. PSDesktop can only step forward, since it is simply a user-interface built on top of EUROPA, and does not take advantage of EUROPA's logging capabilities.

- **Disadvantages:**

- ◆ The copious logging that underlies PlanWorks may slow down execution significantly, this can be a problem for large search problems.
- ◆ It is harder to customize the views and details if the built-in settings are not adequate.
- ◆ In PSDesktop, any visualization tools built to debug and understand the model can easily become the end user interfaces, since it is already built directly on, and interfaces with, EUROPA.
- ◆ In PSDesktop you can customize how you look at the steps that the Solver takes as it explores the search space. Without this it may be very hard to understand what the solver is doing.

These pages step through examples that show how to setup and use PlanWorks. Most examples use the simple *Light* example described in the Quick Start, whose code is located here:

- Setup: Prepare at least one *Planning Sequence* for PlanWorks to use, and open that sequence with PlanWorks.
- View Your Project With PlanWorks How to use the many PlanWorks views to explore and visualize *Planning Sequences*.
- Use Step Mode: The above discussion and examples focus on running PlanWorks in batch mode, where EUROPA has created *Planning Sequences* separately, and PlanWorks simply examines those logs afterwards. It is also possible to run PlanWorks in an interactive *Step Mode* where PlanWorks invokes the EUROPA planner one step at a time. This allows a user to:
 - ◆ Skip ahead to certain step numbers (this can be used to limit the size of the log files for large projects).

- ◆ Access a debug console where debugging output can be turned on and off between steps as desired.

Planning Sequences

The **Project** menu has these options:

- **Project->Open** will bring up pre-loaded plan sequences for a pre-defined project, and allow them to be viewed using the *Planning Sequence* cascading menu.
- **Project->Delete** will remove a pre-loaded project and its sequences from view (if being currently displayed), and from the MySQL data base.
- **Project->Add Sequence** prompts the user, via the sequence chooser dialog, to add one or more sequences to the current project, and the MySQL data base.
- **Project->Delete Sequence** prompts the user, via a list dialog, to remove the selected sequence from the current project, and the MySQL data base.
- **Project->New Sequence** prompts the user, via the Configuration dialog, to begin Step Mode.

The **Planning Sequence** is a pull-down cascading menu of loaded (added) sequence names.

Screen Management

The "Window" pull-down menu offers the user the ability to rearrange all active windows by "tiling", or "cascading". This menu also provides for the individual selection of any active window ordered thusly:

- menu separators divide different plan sequence window groups;
- within each plan sequence group, the ordering is SequenceQueryView, SequenceStepsView, and any QueryResults windows;
- then a cascading sort by step number, and by view name of all partial plan views, including the NavigatorView.

Function Management

Progress monitors are created for functions which can be cpu intensive, such as creating partial plans and rendering views. The user has the option to "Cancel" these operations, if desired.

Tips:

- If PlanWorks is hanging, you may be able to fix it by running `'rm lib/hsqldb/database.*'` (**WARNING:** You will lose all projects and configurations saved in PlanWorks, however, so another approach might be preferable).